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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Integrated Side Banding Seeding Assembly

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(71) Same as inventor

(57) 13 Claims

5,084,8/36

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Notice: This application is as filed and may therefore contain an incomplete specification.

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## ABSTRACT OF THE DISCLOSURE

This invention provides for a single replaceable point to be used in the furrowing of the soil and the simultaneous creation of separate and distinct seed and fertilizer beds. This point attaches to a main body plate that, in turn, attaches to the seeding unit. In this way a minimum amount of effort is required to replace worn or broken points. The integrated side banding seeding assembly attaches to the soil contact end of hoe drills, air drills or air seeders for agricultural use. It allows for the separate placement of seed and fertilizer in one farm operation. Two separate knife-like edges on the soil contact surface act in a cutting fashion to create two openings in the ground. The seed is placed first. The fertilizer placement is offset below and to the side of the seed placement. The layer of earth between the two products creates maximum separation. This device may incorporate an air vent apparatus to reduce the air pressure applied to the products being distributed and reduce the speed of the products as they strike the ground. Placement of fertilizer below and to the left or below and to the right of the seed is achieved through opposite, or mirror image, points.

## INTEGRATED SIDE BANDING SEEDING ASSEMBLY

This application relates to an improved seeding device and more particularly to an improved seeding device combining independent and simultaneous seed and fertilizer application functions.

Seeding and fertilizing have been applied under various conditions by various methods in the past. It has now been shown that it is most desirable to simultaneously fertilize the seed when it is planted, and further, to provide compaction of the soil to better retain moisture and aid germination. A further  
10 development has been to position the fertilizer below and to the side of the seed in an operation called 'side banding'. The placement of the fertilizer and seed in proximity to one another has a tendency to 'burn' the seed. With further development of zero till seeding minimum ground cover disturbance is now required. In so doing, a process known as 'hair pinning' in which straw and debris on the soil surface bind around the seeding assembly so as to plug delivery tubes or eliminate effective seed and fertilizer separation, must be avoided.

According to the present invention there is disclosed an earth  
20 working or seeding implement having a soil engaging assembly having several distinct units. There is a main body that attaches to the seeding implement and there is a primary point soil opener that attaches to the lower front end of the main body. The soil contact edge running from the leading point along its bottom-most surface of the primary point soil opener contains two knife like edges, the first of which creates the opening in the soil for seed placement and the second of which creates the opening in the soil below and beside the seed opening for  
30 fertilizer placement. The lateral distance between the knife edges, the different placement depths resulting from the knife edges, and the trailing nature of the fertilizer knife edge ensures no mixing of seed and fertilizer takes place. The use of

trailing packer ensures proper product placement and product separation. Distribution tubes separately feed seed and fertilizer from their separate supply containers to the point of soil contact behind their respective knife edges.

In view of the above summary it is readily discernable that a primary object of the above invention is the provision of a single integrated and solid soil engaging assembly having no moving parts.

A further object of the instant invention is the provision of a soil engaging assembly that will insure proper and continuous seed and fertilizer placement in the soil.

A further objective of the instant invention is that no straw or soil debris will act to plug the distribution tubes or act to destroy the soil bed formed by the forward action of the soil engaging assembly.

It is a further object of the instant invention to provide a cost effective means by which one can upgrade existing equipment to achieve the benefits of new air seeding technology.

These and other objects of the present invention will become readily apparent as the following description is read in conjunction with the accompanying drawings wherein like reference numerals indicate like elements throughout the several views.

The invention will now be described by way of example only, with reference to the accompanying drawings in which:

Fig. 1 is a side elevation of the shank with mounted side banding seeding assembly.

Fig. 2 is a rear elevation of the side banding seeding assembly indicating the location of the seed and fertilizer distribution tubes.

Fig. 3 is a perspective view of the side banding seeding assembly.

Referring now to figure 1 we have a shank 1 extending from a conventional earth working or seeding implement such as a hoe drill, air drill or air seeder carrying a separate supply of seed and fertilizer (not shown). Attached to the lower end of the shank 1 by means of the main body adapter 2 which can have various forms for adapting to different types of implements is a soil engaging assembly 3. The soil engaging assembly 3 contains a soil knife edge 4 and a fertilizer knife edge 5. These two knife edges create two soil openings in the ground, which at the bottom most area of each are created the seed and fertilizer furrows, respectively. The fertilizer knife edge 5 extends to the rear and below with respect to the seed knife edge 4 and is laterally offset therefrom. The fertilizer knife edge 5 is angled outward at its rear with respect to its front so as to minimize soil fracturing into the seed furrow created by the seed knife edge 4 which would adversely affect seed bed quality. The soil engaging assembly 3 is affixed to the main body 2 by screws, pins, bolts or the like through opening 13.

As shown in figure 2, added to the soil engaging assembly to form the seeding assembly is a seed delivery tube 6 that is attached to the rear of the seed knife edge 4, and carries seed from a supply (not shown) to the furrow created by the seed knife edge 4 as it moves forward.

The bottom-most end of seed delivery tube 6 is positioned so as to prevent displaced soil from the fertilizer knife edge 4 from plugging the opening of seed delivery tube 6.

Also added to the soil engaging assembly to form the seeding assembly is a fertilizer delivery tube 7 that is attached at the rear of fertilizer knife edge and carries fertilizer from a supply (not shown) to a furrow created by the fertilizer knife edge 5 as it moves through the soil. The delivery tubes 6 and 7 will place the seed and fertilizer respectively directly behind the widest part of the respective knife edges 4 and 5. The use of conventional trailing packers assists in ensuring proper seed and fertilizer placement and separation. With the location of the knife edges 4 and 5 and the location of the delivery tubes 6 and 7 there is no point at which the seed and fertilizer can be placed above the seed bed.

As shown in figure 3, the lead edge 8 of the soil engaging assembly 3 acts to cut the soil and direct the soil laterally along the smooth outward face 14 of the soil engaging assembly 3 as it moves forward.

The seed knife edge 4 is angled downward on its outer edge with respect to its inner edge 9 so as to create a slight "V" shape to the furrow in the soil for the seed to settle into that is also protected from fertilizer by the resulting soil ridge.

The bevelled tube sides 10 at the bottom edge of the fertilizer distribution tube 7 direct the fertilizer to the bottom-most area of the fertilizer furrow created by the fertilizer knife 5.

An angular cut 11 at the bottom edge of the fertilizer distribution tube 7 creates an opening that is lower on the forward edge with respect to the rearward edge, and acts to evenly disperse fertilizer within the furrow and to eliminate fertilizer distribution tube 7 pluggage.

An angular cut 12 at the bottom edge of the seed distribution tube 6 creates an opening that is lower on the forward edge with respect to the rearward edge, and acts to evenly disperse seed within the furrow and to eliminate seed distribution tube 6 pluggage.

Various modifications such as size, shape and arrangement of components may be made without departing from the spirit and scope of the invention. The above disclosure shall be interpreted as illustrative only and limited only by the scope of  
10 the invention as defined in the following claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A side banding seeding assembly to be mounted on a tool bearing member of a conventional earth working or seeding implement comprising in combination, a main body to be mounted on said tool bearing member and a seeding assembly mounted on the main body.
2. A side banding seeding assembly as claimed in claim 1 wherein a seed knife edge creates a furrow for seed placement.
3. A side banding seeding assembly as claimed in claim 2 wherein a fertilizer knife edge creates a furrow for fertilizer placement that is below and to the side of the seed furrow.
4. A side banding seeding assembly as claimed in 3 wherein the seed is placed in the soil prior to the fertilizer, thereby placing it on a solid seed bed.
5. A side banding seeding assembly as claimed in 4 wherein the angular nature of the forward most point of the seeding assembly prevents the build-up of straw or soil debris.
6. A side banding seeding assembly as claimed in 5 wherein downward angle to the exterior of the seed knife edge with respect to the interior edge creates a seed bed that separates the seed from the fertilizer.
7. A side banding seeding assembly as claimed in claim 6 further including a first delivery tube mounted on the rear of the seed knife edge for delivery of seed to a furrow formed by said seed knife edge.



A side banding seeding assembly as claimed in claim 7 further including a second delivery tube mounted on the rear of the fertilizer knife edge for delivery of fertilizer to a furrow formed by said fertilizer knife edge with its exit positioned both rearwardly and laterally from said first delivery tube.

9. A side banding seeding assembly as claimed in claim 8 wherein said second furrow created by the fertilizer knife edge extends below said first furrow created by the seed knife edge for placement of fertilizer deeper in the soil than the seed.
10. A side banding seeding assembly as claimed in claim 9 wherein said seeding assembly includes a cavity to receive a portion of said main body.
11. A side banding seeding assembly as claimed in claim 10 wherein said first delivery tube exit has a bevelled opening at a lowermost portion thereof.
12. A side banding seeding assembly as claimed in claim 11 wherein a most rearwardly portion of said fertilizer knife edge is angled outwardly away from the furrow formed by said seed knife edge.
13. A side banding seeding assembly as claimed in claim 12 further including an air vent to reduce the air pressure applied to the seed and fertilizer being distributed and thereby reduce the spreading thereof once they strike the ground.

FIGURE 3

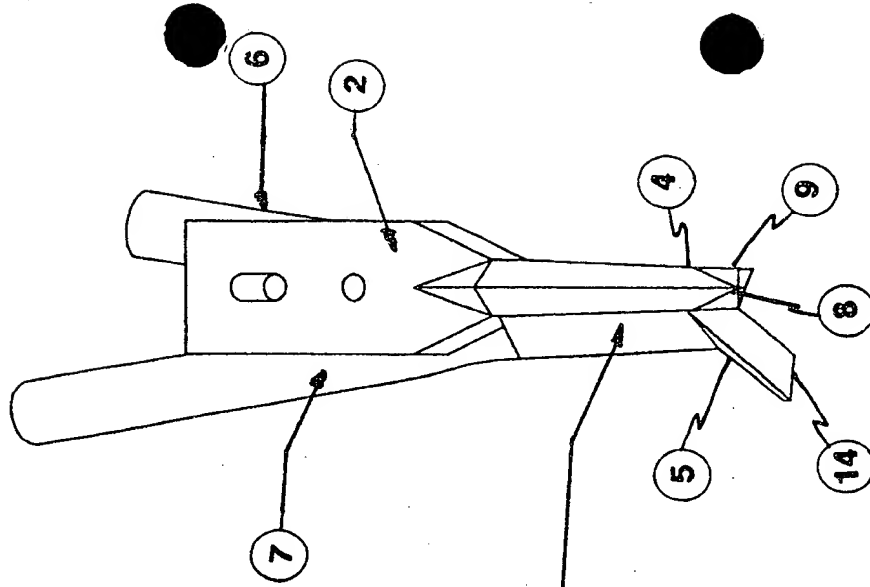


FIGURE 1

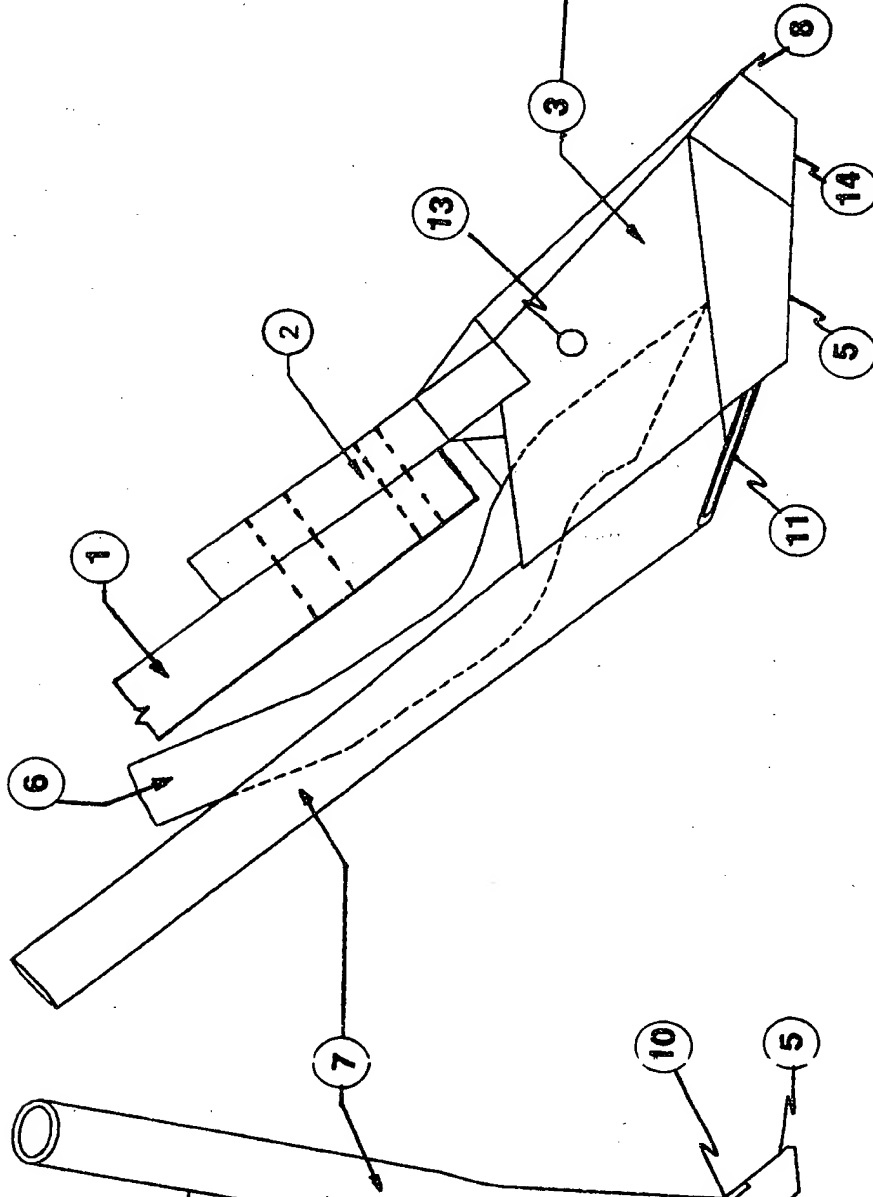
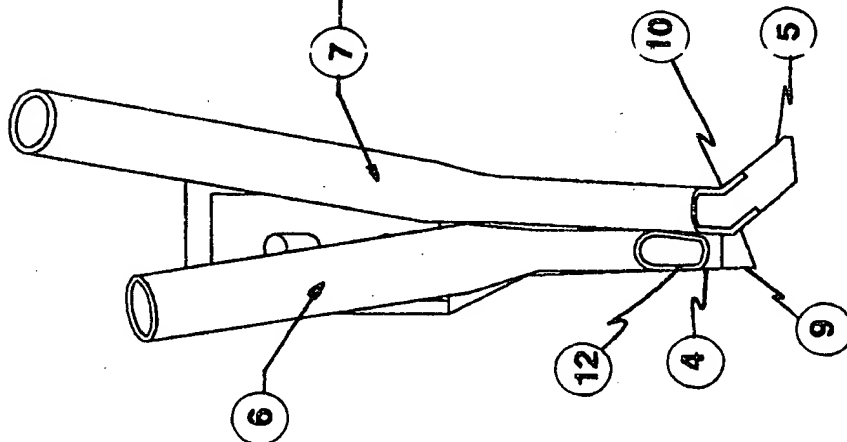


FIGURE 2



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